RESEARCH ARTICLE

# Canine Dystocia: A Clinical Study of 60 Cases for Incidence, Risk Factors and Therapeutic Outcomes

Tyson[1]*, Amit Sharma[1], Ankit Ahuja[2], Vasu Sharma[3], Akshay Sharma[1], Pravesh Kumar[1], Pankaj Sood[1]

## Abstract

Canine dystocia poses significant reproductive challenges in veterinary practice, often leading to maternal and fetal morbidity if not promptly addressed. This prospective clinical study investigated the incidence, predisposing risk factors, haemato-biochemical profiles, and therapeutic outcomes in 60 dystocia-affected canines. Maternal etiologies predominated (76.67%, n=46), with uterine inertia as the primary driver (primary: 32.61%, n=15; secondary: 67.39%, n=31), while fetal causes accounted for 23.33% (n=14), chiefly due to postural malalignments. Incidence varied markedly by demographics: young (<2 years) and geriatric (>6 years) animals exhibited elevated risks (45% and 47%, respectively), primiparous dogs comprised 66.67% of cases, and large breeds (e.g., Labrador Retrievers: 25%; German Shepherds: 18%) were disproportionately affected. Haematological and biochemical evaluations revealed normocytic, normochromic profiles with no significant deviations from physiological norms ($p>0.05$), including normoglycemia (85.47±9.49 mg/dL) and normocalcemia (9.1±0.2 mg/dL). Therapeutic protocols combining intravenous 5% dextrose, calcium gluconate, and oxytocin yielded success in 65.22% of inertia cases (primary: 26.67%; secondary: 83.87%), while manipulative corrections resolved 71.43% of fetal dystocias. Overall, medical/manual management succeeded in 66.67% of instances, with 33.33% requiring Cesarean section. By delineating etiological patterns and optimizing protocols, this study informs evidence-based strategies to enhance reproductive outcomes in canine dystocia, potentially reducing neonatal mortality and breeder economic losses.

**Key words:** Canine dystocia, Haemato-biochemical profile, Parturition, Uterine inertia.

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## Introduction

Parturition is the most critical phase of canine pregnancy, and dystocia defined as difficult or obstructed labour requiring intervention is a common complication encountered in veterinary practice that poses substantial risks to both the dam and the fetus, and often causes considerable emotional distress to pet owners (Reichler and Michel, 2009). In planned breedings, primary uterine inertia failure of the uterus to initiate effective contractions is a leading cause. In contrast, unintended pregnancies more often result in feto-maternal disproportion, followed by single-pup pregnancies and uterine inertia (Jakub *et al.*, 2020). Primary inertia often stems from insufficient fetal stimulation (e.g., singleton pregnancies), overstretching of the myometrium by large litters, oversized fetuses, or excessive fetal fluids, while secondary inertia generally arises when labour arrests before completion of whelping (Noakes *et al.,* 2018). Fetal dystocia may result from malpresentations such as transverse orientation, head deviation, breech posture, or congenital anomalies (Romagnoli *et al.*, 2004).

Breed, age, and parity are well-recognized risk factors influencing the onset and progression of parturition in canines. Several studies have highlighted that certain breeds especially brachycephalic and toy breeds like French Bulldogs, Boston Terriers, Chihuahuas, and Pugs are particularly predisposed to dystocia due to anatomical limitations (Polster, 2006; O'Neill *et al.*, 2017). Advanced maternal age, especially in dogs over six years, has been associated with a higher incidence of obstetrical complications, stillbirths, and uterine inertia (Jakub *et al.*, 2020). Parity also plays a significant role as primiparous dogs exhibiting a markedly higher risk of dystocia, with reported incidences ranging from 31% to 47%, and it gradually declines with successive

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pregnancies (Murthy, 2011; Oluwatoyin and Fayemi, 2011). Interestingly, Polster (2006) noted an inverse relationship between litter size and dystocia, suggesting that fewer pups per litter may increase the risk of parturition failure.

Medical management typically includes oxytocin administration to stimulate contractions. However, its effectiveness diminishes with prolonged labour, especially in large litters (Noakes *et al.,* 2018). Calcium plays a vital role in myometrial contractility, and deficiencies whether due to nutrition, inappropriate supplementation, or prolonged labour can impair normal delivery (Frehner *et al*., 2018). Although hypoglycemia has been implicated in some cases most dogs remain normoglycemic during labour, despite stress-induced hyperglycemia (Lúcio *et al*., 2009). This clinical study investigates the incidence, underlying risk factors, and treatment outcomes of canine dystocia cases, aiming to support better clinical decision-making and improve reproductive outcomes.

## Materials and Methods

The present clinical investigation on canine dystocia was conducted at the Veterinary Gynaecology Unit of the Department of Veterinary Clinical Complex, Dr. G.C. Negi College of Veterinary and Animal Sciences, Chaudhary Sarwan Kumar Himachal Pradesh Krishi Vishvavidyalaya (CSKHPKV), Palampur (32.6ºN, 76.3ºE; altitude 1290.8 meters) from September 2023 to April 2024.

### Selection and Diagnosis of Cases

A total of 60 clinical cases of dystocia in canines were recorded and evaluated during the study period. The diagnosis was based on clinical signs, case history, and diagnostic imaging. Dystocia was suspected in cases where dogs showed signs of parturition such as nesting behaviour, vulvar swelling, mammary gland development, and anorexia between days 58 and 62 of gestation, but failed to expel any fetus. Confirmation of dystocia was made if strong uterine contractions persisted for more than 45-60 min without delivery, or if weak and infrequent contractions were present for over 4-6 h. Additional diagnostic indicators included radiographic evidence of fetal malposition, fetal oversize, maternal illness, or a prior history of dystocia.

### Incidence and Risk Factors

To assess risk factors associated with dystocia, animals were categorized based on age, breed size and parity. Age-wise, dogs were classified as young (0-2 years), adult (2-5 years), and old (≥6 years), as per Ortega-Pacheco *et al.* (2006). Based on adult body weight, breeds were categorized into small (<15 kg), medium (15-25 kg), and large (>25 kg) breeds following the classification of Mila *et al.* (2015).

### Haemato-Biochemical Estimations

Blood samples were collected aseptically from all dystocia-affected canines to assess haematological and biochemical alterations. For haematological analysis, 2 mL of blood was collected in sterile EDTA vials and processed using a BC-2800 Vet Auto Haematology Analyzer (Fresenius Medical Care Pvt. Ltd., New Delhi).

Biochemical parameters assessed included blood glucose, total plasma protein, alanine aminotransferase (ALT), aspartate aminotransferase (AST), and creatinine. Blood glucose was estimated using the glucose oxidase-peroxidase (GOD-PAP) method. Total plasma protein was measured using the direct Biuret method. ALT and AST activities were determined using IFCC-recommended protocols with respective diagnostic kits and Creatinine levels by the modified Jaffe's method. Mineral estimation included calcium and inorganic phosphorus levels by the Arezona method and phospho-molybdate method, respectively, using AGAPPE diagnostic kits on the MISPA CXL Pro Plus automated analyzer.

### Therapeutic Management

The therapeutic management of dystocia in canine was determined based on the underlying cause whether maternal or fetal and the severity of the condition. Initial clinical evaluation included assessment of uterine contractility, cervical dilation, fetal positioning and the general condition of the dam. A combination therapy comprising intravenous infusion of 5% dextrose, calcium, and oxytocin was evaluated in canine diagnosed with either primary or secondary uterine inertia. Oxytocin was administered intramuscularly at doses rate 0.8 IU/kg body weight. Calcium gluconate was administered intravenously at a dose of 0.3 mL/kg body weight to enhance uterine contractility. Cases of fetal dystocia, such as malpresentation, malposition, or fetal oversize, were initially managed by digital vaginal manipulation. Gentle correction of fetal posture was attempted per vaginum, and where necessary, obstetrical instruments like vaginal forceps were used cautiously to assist delivery. When medical or manual management failed, or in cases of obstructive dystocia, complete uterine inertia Cesarean section was performed as the definitive treatment.

## Results and Discussion

### Overall Incidence of Dystocia

In this study period, a total of 60 canine cases were diagnosed with dystocia. Maternal dystocia accounted for the majority of cases (76.66%, n=46), occurring significantly more frequently than fetal dystocia, which comprised 23.33% (n=14) of the cases (Table 1). The primary causes of maternal dystocia were uterine inertia classified as primary (25% n=15) and secondary (51.66% n=31) (Fig.1 b and c). Other contributing factors included prolonged second-stage labour, the dog's temperament, and improper management practices (e.g., nutrition and exercise). Similar findings were reported by Murthy (2011) and Vibha (2012), who also noted a higher prevalence of maternal dystocia in their investigations. Fetal dystocia was primarily associated with postural

defects (head, neck, and limb malpositions). Postural defects accounted for 14 cases, representing 23.33% of the total dystocia cases recorded in the study (Fig.1 a and d). Previous studies identified additional causes, such as fetal oversize, malpresentation, fetal monstrosities, breech presentation, and fetal death (Mehrotra and Ravidutt, 2009; Oluwatoyin and Fayemi, 2011). Murthy (2011) reported that 54.54% of fetal dystocia cases were due to head postural abnormalities, including lateral deviation (18.18%) and ventral flexion (36.36%).

**Table 1:** Incidence and etiological distribution of maternal and fetal dystocia in canines (n=60)

| Etiology | | No. of Cases | Percent |
|---|---|---|---|
| Maternal dystocia | Primary uterine inertia | 15 | 25.00 |
| | Secondary uterine inertia | 31 | 51.66 |
| | **Overall** | **46** | **76.66** |
| Fetal dystocia | Postural defects | **14** | **23.33** |

## Age, Parity and Breed wise Incidence of Dystocia in Canines

Dystocia incidence varied with age, parity, breed, and season. Young (<2 years) and older (>5 years) dogs exhibited high rates (45% and 47%, respectively), while middle-aged dogs (2-5 years) showed lower incidence (8%). Linde Forsberg and Persson (2007) reported a 19.2% increase in dystocia risk in dogs older than four years. Similarly, O'Neill *et al.* (2017) observed a 3.1-fold higher risk in canines aged 3.0-5.9 years, which may be associated with progressive uterine fatigue and reduced myometrial efficiency with advancing age. Large breeds were disproportionately affected, with Labrador Retrievers (25%), German Shepherds (18%), and Golden Retrievers (11%) leading cases. Smaller breeds (Beagles, French Bulldogs, Pugs, and American Bullies) each contributed 7%, while Pomeranians, Mastiffs, and Bull Terriers accounted for 5%, and Shih Tzus (2%) and Mongrels (1%) had minimal rates. Bennur *et al.* (2001) corroborated higher risks in large breeds, likely due to pelvic dimensions, though Long *et al.* (2022) reported elevated rates in small breeds (59.4%), possibly from brachycephalic anatomy. These discrepancies highlight the role of breed-specific factors. Primiparous dogs accounted for 66.67% of cases, compared to 26.67% in pluriparous dogs, representing a 2.5-fold difference. Long *et al.* (2022) found 80.21% of cases in first parities, decreasing thereafter (Oluwatoyin and Fayemi, 2011; Murthy, 2011). Conversely, Linde Forsberg and Persson (2007) found no parity link, possibly due to not distinguishing maternal and fetal causes. Seasonal trends showed peak incidence in summer (38%), followed by winter (32%) and monsoon (30%). Limited research on environmental influences suggests heat stress or breeding patterns may contribute, necessitating further investigation.

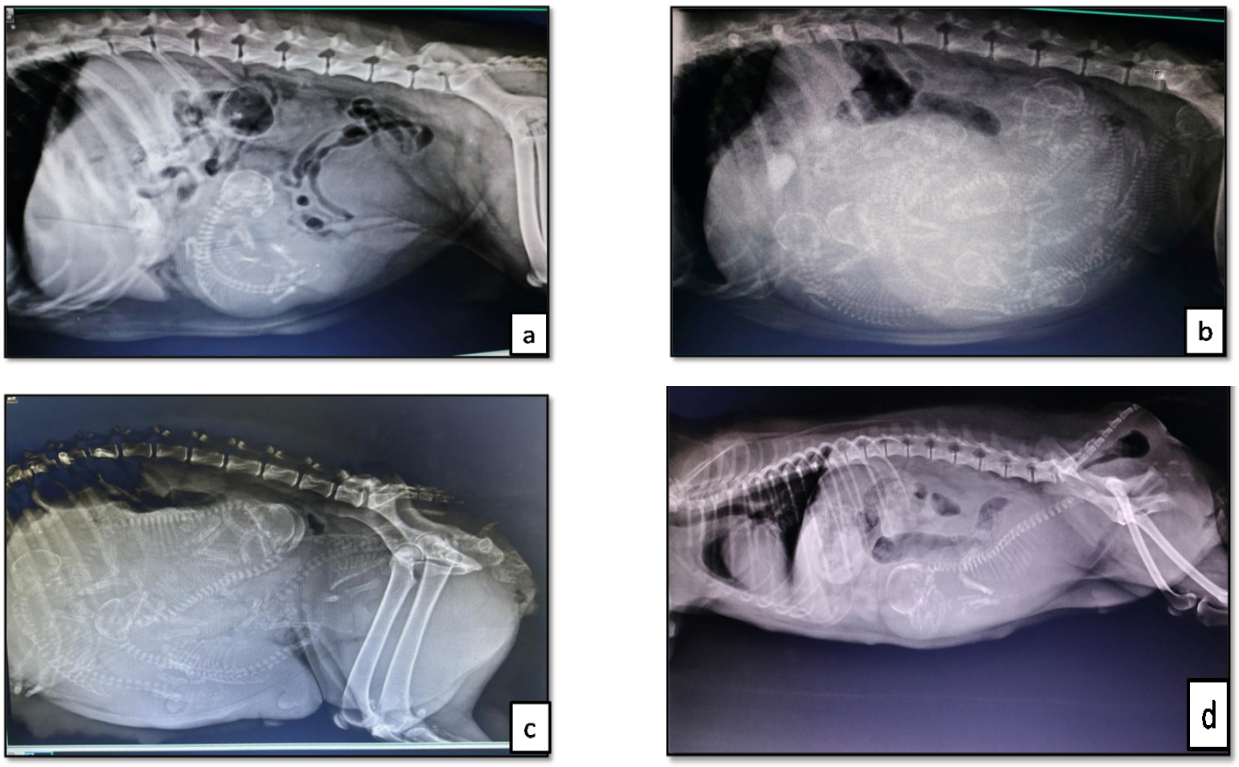


**Fig. 1(a-d):** Lateral radigraphic views of dystocia in canines. a). Singleton pregnancy with fetal malpostion. b-c) Multiple fetuses resulting in uterine overdistension. d) Oversized fetus resulting in fetomaternal disproportion.

## Haemato-Biochemical Evaluation

In the cohort of 60 dystocia-affected dogs, comprehensive haematological evaluations revealed that key parameters, including white blood cell (WBC) count, lymphocyte percentage, red blood cell (RBC) count, platelet count, haemoglobin concentration, and haematocrit (HCT), remained within established physiological norms (Table 2). These observations aligned with prior research, such as Murthy (2011), who documented unremarkable leukocyte profiles in similar cases. While pregnancy can influence erythroid indices, often manifesting as reduced RBC counts and haemoglobin due to haemodilution (Dimco *et al*., 2013; Azab *et al*., 2020), the present findings showed no marked deviations from reference ranges. Comparisons with healthy controls further corroborated the absence of significant haematological perturbations attributable to dystocia. Notably, in subsets with uterine inertia, haemoglobin levels trended toward the lower physiological boundary but lacked statistical divergence.

Biochemical assessments similarly demonstrated stability across parameters. Pretreatment blood glucose averaged 85.47±9.49 mg/dL, indicative of normoglycemia and challenging the historical association of hypoglycemia with uterine inertia (Vibha, 2012). This supports a targeted approach to dextrose therapy, reserving it for confirmed deficits rather than empirical use. Serum calcium concentrations (9.1±0.2 mg/dL) were normocalcemic, underscoring its limited role as a primary driver of dystocia-related contractile dysfunction (Bergström *et al*., 2006; Vibha, 2012). Phosphorus levels (4.8±0.4 mg/dL) also conformed to normal limits, consistent with Bergström *et al*. (2006). Additional markers, including alanine aminotransferase (ALT), aspartate aminotransferase (AST), total protein, and creatinine, exhibited no aberrations, reflecting preserved hepatic and renal function amid dystocia.

**Table 2:** Haemato-biochemical parameters in dystocia-affected canines

| Parameter | Pre-treatment | Post-treatment |
|---|---|---|
| WBC ($\times 10^9$/L) | 15.47 ± 1.07 | 15.70 ± 1.10 |
| Lymphocyte (%) | 21.82 ± 1.18 | 18.50 ± 1.18 |
| RBC ($\times 10^{12}$/L) | 6.44 ± 0.22 | 6.40 ± 0.21 |
| Haemoglobin (g/dL) | 12.86 ± 0.45 | 12.99 ± 0.42 |
| Platelets ($\times 10^9$/L) | 224.28 ± 16.20 | 221.25 ± 15.88 |
| HCT (%) | 37.22 ± 1.24 | 38.15 ± 1.06 |
| ALT (U/L) | 20.37 ± 1.75 | 24.53 ± 2.18 |
| AST (U/L) | 35.81 ± 4.09 | 36.70 ± 4.99 |
| Total protein (g/dL) | 5.83 ± 0.20 | 5.76 ± 0.19 |
| Creatinine (mg/dL) | 0.66 ± 0.04 | 0.72 ± 0.05 |
| Glucose (mg/dL) | 85.47 ± 9.49 | 94.15 ± 6.97 |
| Calcium (mg/dL) | 9.10 ± 0.20 | 9.10 ± 0.10 |
| Phosphorus (mg/dL) | 4.80 ± 0.40 | 5.30 ± 0.40 |

None of the parameters differed significantly at ($p>0.05$).

Post-treatment analyses revealed no significant alterations in any haematological or biochemical parameter compared to pretreatment baselines ($p > 0.05$ for all comparisons; Table 2). This stability suggests that therapeutic interventions, such as calcium and dextrose supplementation, principally augment myometrial contractility and metabolic resilience during parturition, rather than ameliorating inherent biochemical derangements, as evidenced by the persistence of normocalcemic and normoglycemic states (Bawaskar and Sahatpure, 2023). Such interventions thus serve a supportive role in optimizing uterine dynamics without inducing substantive shifts in systemic profiles.

## Treatment Evaluation

The therapeutic efficacy of a combination of intravenous dextrose 5% and calcium gluconate, followed by oxytocin administration, was assessed in 46 female dogs diagnosed with either primary or secondary uterine inertia. Among the 15 animals suffering from primary uterine inertia, only 4 responded positively to the treatment protocol, reflecting a success rate of 26.6%. Notably, the study by Kumar *et al*. (2018) evaluated different treatment protocols using oxytocin, dextrose and calcium for complete primary uterine inertia and reported that success rates with medical management failed to significantly augment the uterine contractions, underscoring the challenge of treating primary uterine inertia. In contrast, the response was significantly better in cases of secondary uterine inertia, with 26 out of 31 animals responding favourably, yielding a success rate of 83.87%. Previous studies have highlighted the beneficial role of calcium and dextrose infusion in stimulating uterine activity and managing uterine inertia effectively. Calcium administration, in particular, is known to enhance the force of myometrial contractions (Wray *et al.,* 2003).

In the current study, animals presented with signs of uterine inertia were initially managed with calcium to potentiate uterine muscle contractility, followed by oxytocin to enhance the frequency of contractions. Overall, 30 of the 46 (65.21%) dogs with uterine inertia exhibited successful outcomes following this treatment regimen. The present treatment regime aligned with the observations of Davidson and Cain (2023), who emphasized that while oxytocin improves contraction frequency, calcium plays a crucial role in enhancing uterine tone, particularly in prolonged labour cases. Similarly, Runcan and da Silva (2018) demonstrated that a therapy involving calcium and oxytocin yielded success in medically managing uterine inertia in canines. However, the specific contribution of calcium versus oxytocin remains difficult to delineate when used together. Bergström *et al*. (2010) also pointed out that while oxytocin alone may suffice in some cases, individualization of treatment based on clinical presentation and response is crucial.

In this study, 14 cases of fetal dystocia were identified as potentially resolvable through vaginal manipulative interventions. Digital manipulation alone proved minimally

effective, with success in only 1 of the 14 (7.14%) animals. Conversely, combining vaginal manipulation with the use of vaginal forceps yielded significantly better outcomes. Among 14 animals managed with both techniques, 9 responded successfully, indicating a success rate of 64.29%. This underscores the utility of vaginal forceps in facilitating the correction of fetal malposition and posture, especially when digital manipulation alone is ineffective. Out of the 60 dogs diagnosed with dystocia, 40 (66.66%) responded successfully to medical or manual interventions. However, 20 dogs (33.33%) did not respond to the initial treatment protocols comprising 16 cases of maternal dystocia and 4 cases of fetal dystocia and subsequently underwent surgical intervention via Cesarean section. A comparative studies analysis of 2,489 litters (Cornelius *et al.,* 2019) found a 23.8% dystocia rate, highest in small litters (36.5%), with older dams and larger litters raising stillbirth risks (5.9% overall; 2.35x higher in dystocia cases). This supports prompt intervention, as labour >4-6 h increases puppy mortality, highlighting forceps' role in non-surgical resolution. Collectively, these findings highlight the benefits of prompt, tailored, stepwise approaches combining medical treatments for uterine inertia and tool-assisted manipulation for fetal dystocia to boost non-surgical success and enhance maternal and neonatal well being.

## Conclusion

This clinical study on canine dystocia illuminates key etiological patterns, revealing maternal inertia as the predominant factor modulated by age, parity, breed, and seasonal influences, with primiparous and large-breed dogs at elevated risk. The findings demonstrate stable haemato-biochemical profiles, advocating for precision-guided therapies over empirical supplementation, achieving non-surgical resolution in two-thirds of cases through integrated dextrose, calcium, and oxytocin protocols. Although medical and manipulative approaches yielded favorable resolutions in the majority of instances, a notable proportion of cases necessitated recourse to Cesarean section for definitive management.

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# ANNOUNCEMENT - III
# FELLOWS AND ASSOCIATE FELLOWS AWARDS: SVSBT-2026

Applications in the prescribed formats are invited from the **Life Members** of the Society for the **Fellows and Associate Fellows Awards of SVSBT-2026.** The awards will be honoured to the deserving candidates during the inaugural ceremony of ***XII Annual Convention*** and ***National Symposium*** to be held **during October 6-7, 2026** at College of Veterinary Science, **BASU, Patna-800014,** Bihar, India.

The application format can be had on request from the President, SVSBT by e-mail at ajdhami59@gmail.com or WhatsApp No. 9898262498. The **application must be submitted only as soft copy in 2 PDFs** to the President, SVSBT, Anand, Gujarat at ajdhami59@gmail.com. **Part-1:** Application in detail along with self-assessed scorecard, and **Part-2:** All other supporting documents for each claim, including only the first page of published articles/books/manuals etc. **on or before 31st July, 2026**. **It is mandatory that the applicant must be LM of the Society**, or else he/she should become life member by due date of application through paying prescribed fees online in the UCO Bank A/C as detailed below. Incomplete applications and those received after the due date will not be entertained. SVSBT reserves the rights for the final selection of the awardees.

## Eligibility Criteria & Rules for SVSBT FELLOW AWARD

- The applicant must be a life member of the SVSBT, If not, must register before due date of application.
- Applicant must have a minimum experience of 25 years in the field of teaching research and extension, and should be above 50 years of age, as on the last date of application.
- He/She should be Indian national, who is working in the field of Veterinary Science & Animal Biotechnology & its Allied/Corporate sector in India.
- Awardees may also be nominated by the executive committee from the corporate/ entrepreneurs, on the basis of distinguished contribution in scientific arena of Veterinary Science & Animal Biotechnology towards development of animal sciences.
- Application must include Full details as per the format that can be had from the President SVSBT on request and submitted online in PDF format with all necessary documents/evidences of each claim made to: ajdhami59@gmail.com **on or before 31st July, 2026**.
- Processing fee Rs. 2000/- is to be paid online in SVSBT A/C by the applicant before submission of application.
- Selected candidate shall pay Rs. 7000/- online within 15 days of intimation of results

## Eligibility Criteria & Rules for SVSBT ASSOCIATE FELLOW AWARD

- The applicant must be having MVSc/PhD degree in Veterinary Science or Animal Biotech, and life membership of the SVSBT
- Applicant should be between 40 and 50 years of age on the last date of application.
- He/She should be Indian national, who is working in the field of Veterinary Science & Animal Biotechnology in India
- Application must include Full details as per the format that can be had from the President SVSBT on request, and submitted online in PDF format with all necessary documents/evidences of each claim made to: ajdhami59@gmail.com **on or before 31st July, 2026**.
- Processing fee Rs. 1000/- is to be paid online in SVSBT A/C by the applicant before submission of application.
- Selected candidate shall pay Rs. 5000/- online within 15 days of intimation of results.

***Bank Details for Processing Fee*: Online** Payment **in favour of SVSBT**, **payable at UCO Bank, Anand Branch, Account No. 18400110008843, IFSC code: UCBA0000082.**